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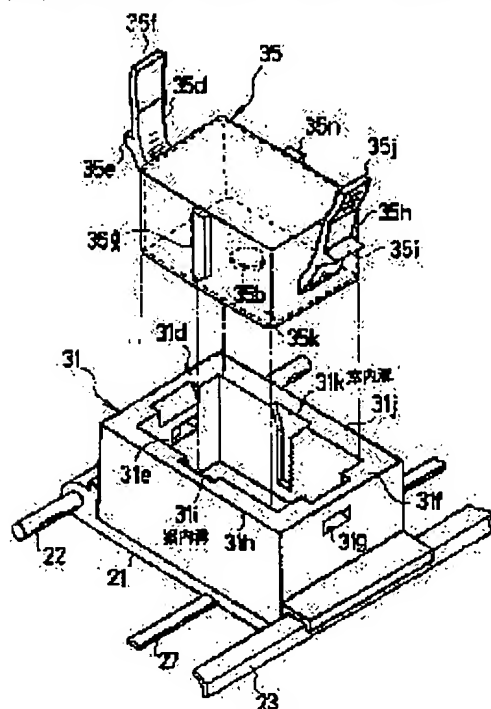
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(54) MOUNTING STRUCTURE FOR INK CARTRIDGE



(57)Abstract:

PURPOSE: To easily mount and remove an ink cartridge at or from a head holder mounted at a carriage.

CONSTITUTION: A head holder 31 mounted at a carriage 21 has openings 31e, 31g at a pair of sidewalls and guide grooves 31i, 31k at the other pair of sidewalls. An ink cartridge 35 has elastic pieces 35d, 35h having pawls 35e, 35i engaged with an opening at the pair of sidewalls, and protrusions 35l, 35n engaged with the guide grooves at the other pair of sidewalls. The cartridge 35 is straightly vertically moved with respect to the holder 31 with the elastic pieces to be able to be mounted or removed.

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CLAIMS

[Claim(s)]

[Claim 1] It is the attaching structure of the ink cartridge which attaches the box-like ink cartridge which held the ink for record removable from the upper part among one pair of side-attachment-wall sections which were prepared in the head electrode holder of the letter of upper part disconnection, and which counter. The ink feed hopper formed in the bottom wall section of said ink cartridge, and the connection cylinder part which protrudes on the bottom wall section of said head electrode holder, is connected with an ink feed hopper, and supplies the ink of an ink cartridge to a recording head, Attaching structure of the ink cartridge characterized by having one pair of elastic pieces which have the engagement section which can engage with one pair of stop sections formed in one pair of side-attachment-wall sections which said head electrode holder counters, and the stop section which are one pair of elastic pieces prepared in said ink cartridge, and corresponds.

[Claim 2] Said elastic piece is the attaching structure of the ink cartridge according to claim 1 characterized by really being formed in an ink cartridge.

[Claim 3] It is the attaching structure of the ink cartridge according to claim 1 or 2 which said stop section is rectangle opening and is characterized by said engagement section being really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece.

[Claim 4] Said engagement section is the attaching structure of the ink cartridge according to claim 3 characterized by preparing the control unit for engagement discharge which projects above a head electrode holder when it is formed in the section in the middle of an elastic piece and an ink cartridge is attached in the upper limit section of an elastic piece at a head electrode holder.

[Claim 5] Said head electrode holder is the attaching structure of the ink cartridge according to claim 1 which has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which are box-like [containing said one pair of side-attachment-wall sections which counter], and adjoin said one pair of side-attachment-wall sections which counter, and is characterized by said ink cartridge having the height engaged possible [the slide to the guide rail].

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the thing which especially an ink cartridge is

dropped to a straight lower part, and enabled it to attach it simply in the head electrode holder of the letter of upper part disconnection about the attaching structure of the ink cartridge which held the ink for record.

[0002]

[Description of the Prior Art] In the ink jet recording device which is made to inject ink conventionally from two or more injection nozzles prepared in the recording head, and records an alphabetic character and an image on a form While the recording head of the letter of opposite is prepared in a form at a head electrode holder, in the head electrode holder While holding the ink for record which the tubed connection cylinder part (the so-called manifold) in which the ink supply way which is open for free passage to a recording head was formed is formed, and is supplied to a recording head, it equips with the ink cartridge which prepared the ink feed hopper removable.

[0003] by the way, in this kind of ink jet recording device While the tubed connection cylinder part which is open for free passage to a recording head and its recording head is generally attached in the perpendicular wall of the head electrode holder prepared in the abbreviation level condition By attaching in an abbreviation horizontal direction the ink cartridge which has the ink feed hopper which can be attached outside the connection cylinder part in the side-attachment-wall section to a head electrode holder As opposed to the form to which supplies the ink of an ink cartridge to a recording head through a connection cylinder part, and paper is fed in the direction of a vertical While the recording mechanism of the level injection type which an abbreviation horizontal direction is made to inject ink and records it from a recording head is generally used In recording in the section in the middle of the form conveyance path of an abbreviation horizontal direction if a recording head and a connection cylinder part are attached in the bottom wall section of the box-like head electrode holder of the letter of upper part disconnection -- being also alike -- As opposed to the form to which attaches the ink cartridge which has the ink feed hopper attached outside the connection cylinder part in the bottom wall section from the upper part in a head electrode holder, and paper is fed horizontally The recording mechanism of the lower part injection type which an abbreviation lower part is made to inject ink and records it from a recording head is also put in practical use.

[0004] As attaching structure of the ink cartridge in the lower part injection type of recording mechanism As shown in drawing 5, for example, to bottom wall section 131a of the box-like head electrode holder 131 of the letter of upper part disconnection While the recording head 132 in which two or more injection nozzles were formed is attached Tubed connection cylinder part (manifold) 131b which has ink path 131c which is open for free passage to the recording head 132 is formed in the inside in the shape of a protrusion. To the connection cylinder part 131b The seal member 133 made of the rubber for ink leakage prevention is attached, and the filter 134 of the shape of a fine stitch from which the dust contained in ink is removed is further attached in the point. Furthermore, the rectangle openings 131e and 131g are formed in one pair of side-attachment-wall sections 131d and 131f which counter, respectively.

[0005] On the other hand, the ink hold material 136 which consists of porous materials, such as urethane foam which made the ink for record absorb enough, is formed in the box-like ink cartridge 135 made of synthetic resin, and circular ink feed hopper 135b which can be attached outside tubed connection cylinder part 131b is formed in it at the bottom wall section 135a. furthermore, an elastic piece band-like to one [among one pair of side-attachment-wall sections 135c and 135g which counter] side-attachment-wall section 135c -- 135d really forms -- having -- the elastic piece -- the height direction which is 135d -- the middle -- while claw part 135e of the shape of a cross-section triangle which can engage with rectangle opening 131e is formed,

height 135p to which 135g of side-attachment-wall sections of another side can engage with 131g of rectangle openings is formed in the section.

[0006] And in order to attach an ink cartridge 136 in the head electrode holder 131 As shown in drawing 5 (a), so that height 135p may be made to engage with 131g of rectangle openings first As a height side (it sets to drawing and is right-hand side) is made low, an ink cartridge 135 is leaned, it is made to advance into the head electrode holder 131 and it is shown in drawing 5 (b) Making height 135p engage with 131g of rectangle openings, elastic one side (it sets to drawing and is left-hand side) is dropped, and he makes claw part 135e engage with rectangle opening 131e, and is trying to attach it finally. After operating 135f of control units of 135d of elastic pieces inside and canceling engagement to claw part 135e and rectangle opening 131e, anchoring mentioned above is a reverse order and he is trying to demount an ink cartridge 135 from the head electrode holder 131 on the other hand.

[0007]

[Problem(s) to be Solved by the Invention] In the attaching structure of an ink cartridge [in / as explained based on drawing 5 / a lower part injection type recording mechanism] Since claw part 135e is made to engage with rectangle opening 131e, making it advance into the head electrode holder 131 with the unstable posture which leaned the ink cartridge 135 at the same time it makes height 135p engage with 131g of rectangle openings In the middle of anchoring actuation of an ink cartridge 135, that demount and actuation is complicated and its anchoring actuation, or removal actuation There are problems, such as making the expensive filter 134 attached in connection cylinder part material 131b of the letter of a protrusion hook and damage the corner of an ink cartridge 135.

[0008] The purposes of this invention are anchoring and demounting, being able to simplify actuation and offering [of an ink cartridge] the anchoring and the attaching structure of an ink cartridge which can be detached and attached smoothly, without demounting and making it sometimes collide to each part in a head electrode holder moreover.

[0009]

[Means for Solving the Problem] The attaching structure of the ink cartridge concerning claim 1 It is the attaching structure of the ink cartridge which attaches the box-like ink cartridge which held the ink for record removable from the upper part among one pair of side-attachment-wall sections which were prepared in the head electrode holder of the letter of upper part disconnection, and which counter. The ink feed hopper formed in the bottom wall section of an ink cartridge, and the connection cylinder part which protrudes on the bottom wall section of a head electrode holder, is connected with an ink feed hopper, and supplies the ink of an ink cartridge to a recording head, It has one pair of elastic pieces which have one pair of stop sections formed in one pair of side-attachment-wall sections which a head electrode holder counters, and the engagement section which can engage with the stop section which are one pair of elastic pieces prepared in the ink cartridge, and corresponds.

[0010] In invention of claim 1, said elastic piece is really formed in an ink cartridge for the attaching structure of the ink cartridge concerning claim 2. In invention of claim 1 or claim 2, said stop section of the attaching structure of the ink cartridge concerning claim 3 is rectangle opening, and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece.

[0011] The control unit for engagement discharge to which the attaching structure of the ink cartridge concerning claim 4 projects above a head electrode holder when said engagement section attaches an ink cartridge in the upper limit section of an elastic piece by being formed in the section in the middle of an elastic piece in invention of claim 3 at a head electrode holder is

prepared. The attaching structure of the ink cartridge concerning claim 5 is box-like [in which said head electrode holder contains one pair of side-attachment-wall sections which counter] in invention of claim 1, and has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter, and an ink cartridge has the height engaged possible [the slide to the guide rail].

[0012]

[Function] In the attaching structure of the ink cartridge concerning claim 1 An ink feed hopper is formed in the bottom wall section of the box-like ink cartridge which held the ink for record. In the bottom wall section of the head electrode holder of the letter of upper part disconnection While the connection cylinder part which is connected with an ink feed hopper and supplies the ink of an ink cartridge to a recording head protrudes, in one pair of side-attachment-wall sections which a head electrode holder counters While one pair of stop sections are formed, to an ink cartridge Since one pair of elastic pieces which have the engagement section which can engage with the corresponding stop section are prepared An ink cartridge is held into a level posture, and if it is made to descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter, one pair of elastic pieces of an ink cartridge will descend, contacting one pair of side-attachment-wall sections of a head electrode holder through the elasticity. And since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively when the connection cylinder part of a head electrode holder is connected with the ink feed hopper of an ink cartridge, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0013] In the attaching structure of the ink cartridge concerning claim 2, although the same operation as claim 1 is done so, without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0014] In the attaching structure of the ink cartridge concerning claim 3, although the same operation as claim 1 or claim 2 is done so Said stop section is rectangle opening. Said engagement section Since it is really a formation **** longitudinal-section abbreviation triangle-like claw part, while being able to form the stop section in an elastic piece easily [the side-attachment-wall section] at the time of shaping A claw part can really be formed in an elastic piece at the time of shaping, and since the claw part is a longitudinal-section abbreviation triangle-like further, a claw part can be made simply engaged to corresponding rectangle opening.

[0015] In the attaching structure of the ink cartridge concerning claim 4, although the same operation as claim 3 is done so Said engagement section is formed in the section in the middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0016] In the attaching structure of the ink cartridge concerning claim 5, although the same

operation as claim 1 is done so Said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. It has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter. Said ink cartridge Since it has the height which engages with the guide rail possible [a slide], a height by making a corresponding guide rail meet It can detach and attach smoothly, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder, holding an ink cartridge into a stable posture. [0017]

[Example] Hereafter, the example of this invention is explained based on a drawing. This example is a thing at the time of applying to the attaching structure of the ink cartridge in the recording mechanism prepared in the ink jet recording apparatus. As shown in drawing 1 , the ink jet recording device 1 establishes fundamentally the form-feed device 10 in which Form P is conveyed horizontally, the carriage drive 20 which drives carriage 21, and the recording mechanism 30 which is made to inject from two or more injection nozzles which prepared the ink held in the ink cartridge 35 in the recording head 32, and is recorded on Form P in the body case 2.

[0018] If the form-feed device 10 is explained, as shown in drawing 1 , to first, the form conveyance direction upstream and the downstream of carriage 21 which are mentioned later One pair of delivery rollers 11 and 12 are arranged by the longitudinal-direction sense, respectively. Each of these delivery rollers 11 and 12 In the right-and-left both ends, it is supported pivotable with the side-attachment-wall plate which is not illustrated, and it drives to a predetermined hand of cut with the roller drive besides illustration, and the form P to which paper was fed is conveyed to an abbreviation horizontal direction the migration direction and the letter of a rectangular cross of carriage 21 immediately through the carriage 21 bottom.

[0019] Next, the carriage drive 20 is explained based on drawing 1 , drawing 2 , and drawing 4 . The abbreviation tabular carriage 21 is arranged horizontally, and the carriage 21 is supported free [longitudinal-direction migration] in the front end section by form conveyance path immediately the bottom with the guide rod 22 and the guide rail 23 arranged in parallel while it is supported free [longitudinal-direction migration] in the back end section by the delivery rollers 11 and 12 and the guide rod 22 arranged in parallel. These guide rods 22 and a guide rail 23 are supported with the side-attachment-wall plates 4 and 5 in the right-and-left both ends, respectively.

[0020] on the other hand, the driving pulley 25 attached in the driving shaft of the carriage drive motor 26 is formed, the endless-like timing belt 27 covers both [these] the pulleys 24 and 25, it is built [the left end section of the successive range of carriage 21 is resembled as if the follower pulley 24 is supported pivotably pivotable by the frame besides illustration, and] at that right end section, and it connects with this timing belt 27 in the lower limit section of carriage 21. And if the rotation drive of the carriage drive motor 26 is carried out, through both [these] the pulleys 24 and 25 and a timing belt 27, carriage 21 will be supported by these guide rods 22 and the guide rail 23, and a migration drive will be carried out in the record direction (right) and the anti-record direction (left).

[0021] Next, it is laid in carriage 21 and the recording mechanism 30 recorded on Form P by injection of ink is explained based on drawing 1 - drawing 4 . On said carriage 21, the box-like head electrode holder 31 of the letter of upper part disconnection has fixed. While the recording head 32 in which two or more ink supply way 32a corresponding to two or more injection nozzles was formed is attached in the back end section side of the bottom wall section 31a bottom of the head electrode holder 31, tubed connection cylinder part (so-called manifold) 31b

projected up is formed in the center section of the bottom wall section 31a. That is, an abbreviation lower part is made to inject ink and recording heads 32 are consisted of by the lower part injection type recorded on the form P horizontally conveyed immediately to the down side.

[0022] While ink path 31c which is open for free passage to a recording head 32 is formed, the interior of the connection cylinder part 31b is equipped with the seal member 33 made of rubber in order that the outside of the connection cylinder part 31b may prevent ink leakage. In order to remove the dust contained in the ink supplied, the filter 34 which knit the stainless steel wire rod with a diameter of several microns reticulated is attached in the upper limit of the connection cylinder part 31b. The long rectangle openings 31e and 31g are formed in the longitudinal direction which is the stop section at the section near the upper limit of one pair of side-attachment-wall sections 31e and 31f which were prepared before and after said head electrode holder 31 and which counter, respectively. Furthermore, inside one pair of side-attachment-wall sections 31h and 31j which were prepared in right and left of the head electrode holder 31 and which counter, the guide rails 31i and 31k which have the predetermined width of face prolonged in the vertical direction are formed, respectively.

[0023] Said ink cartridge 35 is box-like [removable in the head electrode holder 31 / made of synthetic resin], and the ink hold material 36 which consists of urethane foam which the ink for record was made to fully permeate is formed in the interior. Moreover, circular ink feed hopper 35b which can be attached outside connection cylinder part 32b is formed in the center section of bottom wall section 35a of an ink cartridge 35. The elastic pieces [of the predetermined width of face which has elasticity and is prolonged up / 35d and 35h] lower limit section is formed in the section near the lower limit of one pair of side-attachment-wall sections 35c and 35g which were prepared before and after the ink cartridge 35 and which counter in one, respectively.

[0024] and the each elastic pieces [35d and 35h] height direction -- the middle -- while the claw parts 35e and 35i of the shape of a longitudinal-section abbreviation triangle which is the engagement section are formed, respectively, when an ink cartridge 35 is attached in the head electrode holder 31, the control units 35f and 35j for engagement discharge which project above the head electrode holder 31 are formed in the each elastic pieces [35d and 35h] upper limit section at the section, respectively. Furthermore, the heights 35l and 35n prolonged in the vertical direction which engages with the corresponding guide rails 31i and 31k formed in the side-attachment-wall sections 31h and 31j of the head electrode holder 31 possible [a slide] are formed in the outside of one pair of side-attachment-wall sections 35k and 35m which counter established in right and left of an ink cartridge 35, respectively.

[0025] Next, the operation when attaching an ink cartridge 35 in the head electrode holder 31 is explained based on drawing 3 and drawing 4 . First, the elastic pieces 35d and 35h are the sense corresponding to the rectangle openings 31e and 31g, moreover, hold an ink cartridge 35 into a level posture, and make it descend from the upper part in the head electrode holder 31, as shown in drawing 4 . An ink cartridge 35 can be made to advance into the head electrode holder 31 by making these heights 35l and 35n engage with the corresponding guide rails 31i and 31k, and sliding them at this time, being able to position an ink cartridge 35 to a cross direction and a longitudinal direction, and holding it to a stable horizontal position.

[0026] At this time, one pair of elastic pieces 35d and 35h of an ink cartridge 35 descend, contacting one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31 through that elasticity, respectively. And as shown in drawing 3 , when connection cylinder part 32b of the head electrode holder 31 is connected with ink feed hopper 35b of an ink cartridge 35, it can engage with the rectangle openings 31e and 31g to which the claw parts 35e and 35i

prepared in the elastic pieces 35d and 35h are equivalent certainly respectively automatically, and an ink cartridge 35 can be attached in the head electrode holder 31.

[0027] At this time, the upper limit section of connection cylinder part 32b inserts in ink feed hopper 35b, and contacts the ink hold material 36 in the shape of press from a lower part.

Thereby, the ink of the ink hold material 36 is supplied to a recording head 32 through ink supply way 32a of connection cylinder part 32b. Here, when the seal member 33 is pressed by ink feed hopper 35b in the shape of adhesion, it is prevented that the ink of the ink hold material 36 leaks outside.

[0028] On the other hand, as shown in drawing 3, when the ink cartridge 35 is attached in the head electrode holder 31 Operate the control units 35f and 35j of each other prepared in the elastic pieces 35d and 35h inside, and by carrying out elastic deformation of each elastic pieces 35d and 35h, as a two-dot chain line shows Engagement to the claw parts 35e and 35i and the rectangle openings 31e and 31g which were prepared in the elastic pieces 35d and 35h can be canceled easily, and, moreover, an ink cartridge 35 can be demounted upwards in the state of the anchoring posture.

[0029] Thus, while preparing ink feed hopper 35b in bottom wall section 35a of the box-like ink cartridge 35 and preparing connection cylinder part 32b in bottom wall section 31a of the head electrode holder 31 One pair of rectangle openings 31e and 31g are formed in one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31. Furthermore, since one pair of elastic pieces 35d and 35h which have the claw parts 35e and 35i which can engage with the rectangle openings 31e and 31g were formed in one pair of side-attachment-wall sections 35c and 35g of an ink cartridge 35 Only by holding an ink cartridge 35 into a level posture, and making it descend from the upper part in the head electrode holder 31 It descends, while one pair of elastic pieces 35d and 35h of an ink cartridge 35 carry out elastic deformation and contact the side-attachment-wall sections 31d and 31f. From engaging with the rectangle openings 31e and 31g to which the elastic pieces [35d and 35h] claw parts 35e and 35i are equivalent automatically, respectively It can attach easily [the head electrode holder 31], without making an ink cartridge 35 collide with each part, such as the filter 34 of the head electrode holder 31.

[0030] By furthermore, the thing which the elastic pieces [35d and 35h] control units 35f and 35j of each other are operated inside, and is done for the elastic deformation of each elastic pieces 35d and 35h when the ink cartridge 35 is attached in the head electrode holder 31 Engagement to claw parts 35e and 35i and the rectangle openings 31e and 31g can be canceled easily, and it can demount simply and smoothly only by moreover pulling up an ink cartridge 35 upwards in the state of the anchoring posture, without making it collide with each part of the head electrode holder 31.

[0031] In addition, said head electrode holder 31 may be attaching structure which you may have only one pair of side-attachment-wall sections 31d and 31f which counter, and the head electrode holder 31 is attached on carriage 21 in the shape of an inclination, and is attached in the direction of slant to the head electrode holder 31. Furthermore, the elastic pieces 35d and 35h of an ink cartridge 35 may be formed so that it may extend up in the shape of U character from bottom wall section 35a, and they may be formed two or more pairs not only in one pair. In addition, based on an obvious technique, various modification can be added to an existing technique and this existing contractor about said example.

[0032]

[Effect of the Invention] While according to the attaching structure of the ink cartridge concerning claim 1 preparing an ink feed hopper in the bottom wall section of a box-like ink cartridge and preparing a connection cylinder part in the bottom wall section of a head electrode

holder Since one pair of stop sections were prepared in one pair of side-attachment-wall sections of a head electrode holder and one pair of elastic pieces which have further the engagement section which can engage with the stop section in an ink cartridge were prepared Only by holding an ink cartridge into a level posture and making it descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter It descends, while one pair of elastic pieces of an ink cartridge carry out elastic deformation and contact the side-attachment-wall section of a head electrode holder. Since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0033] According to the attaching structure of the ink cartridge concerning claim 2, the same effectiveness as claim 1 is done so, but without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0034] According to the attaching structure of the ink cartridge concerning claim 3, do so the same effectiveness as claim 1 or claim 2, but Said stop section is rectangle opening. Said engagement section Since it is really a formation **** longitudinal-section abbreviation triangle-like claw part, while being able to form the stop section in an elastic piece easily [the side-attachment-wall section] at the time of shaping A claw part can really be formed in an elastic piece at the time of shaping, and since the claw part is a longitudinal-section abbreviation triangle-like further, a claw part can be made simply engaged to corresponding rectangle opening.

[0035] According to the attaching structure of the ink cartridge concerning claim 4, do so the same effectiveness as claim 3, but Said engagement section is formed in the section in the middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0036] According to the attaching structure of the ink cartridge concerning claim 5, do so the same effectiveness as claim 1, but Said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. It has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin one pair of the side-attachment-wall sections which counter. Said ink cartridge Since it has the height which engages with the guide rail possible [a slide], a height by making a corresponding guide rail meet It can detach and attach smoothly, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder, holding an ink cartridge into a stable posture.

[Industrial Application] This invention relates to the thing which especially an ink cartridge is dropped to a straight lower part, and enabled it to attach it simply in the head electrode holder of the letter of upper part disconnection about the attaching structure of the ink cartridge which held the ink for record.

PRIOR ART

[Description of the Prior Art] In the ink jet recording device which is made to inject ink conventionally from two or more injection nozzles prepared in the recording head, and records an alphabetic character and an image on a form While the recording head of the letter of opposite is prepared in a form at a head electrode holder, in the head electrode holder While holding the ink for record which the tubed connection cylinder part (the so-called manifold) in which the ink supply way which is open for free passage to a recording head was formed is formed, and is supplied to a recording head, it equips with the ink cartridge which prepared the ink feed hopper removable.

[0003] by the way, in this kind of ink jet recording device While the tubed connection cylinder part which is open for free passage to a recording head and its recording head is generally attached in the perpendicular wall of the head electrode holder prepared in the abbreviation level condition By attaching in an abbreviation horizontal direction the ink cartridge which has the ink feed hopper which can be attached outside the connection cylinder part in the side-attachment-wall section to a head electrode holder As opposed to the form to which supplies the ink of an ink cartridge to a recording head through a connection cylinder part, and paper is fed in the direction of a vertical While the recording mechanism of the level injection type which an abbreviation horizontal direction is made to inject ink and records it from a recording head is generally used In recording in the section in the middle of the form conveyance path of an abbreviation horizontal direction if a recording head and a connection cylinder part are attached in the bottom wall section of the box-like head electrode holder of the letter of upper part disconnection -- being also alike -- As opposed to the form to which attaches the ink cartridge which has the ink feed hopper attached outside the connection cylinder part in the bottom wall section from the upper part in a head electrode holder, and paper is fed horizontally The recording mechanism of the lower part injection type which an abbreviation lower part is made to inject ink and records it from a recording head is also put in practical use.

[0004] As attaching structure of the ink cartridge in the lower part injection type of recording mechanism As shown in drawing 5 , for example, to bottom wall section 131a of the box-like head electrode holder 131 of the letter of upper part disconnection While the recording head 132 in which two or more injection nozzles were formed is attached Tubed connection cylinder part (manifold) 131b which has ink path 131c which is open for free passage to the recording head 132 is formed in the inside in the shape of a protrusion. To the connection cylinder part 131b The seal member 133 made of the rubber for ink leakage prevention is attached, and the filter 134 of the shape of a fine stitch from which the dust contained in ink is removed is further attached in the point. Furthermore, the rectangle openings 131e and 131g are formed in one pair of side-attachment-wall sections 131d and 131f which counter, respectively.

[0005] On the other hand, the ink hold material 136 which consists of porous materials, such as urethane foam which made the ink for record absorb enough, is formed in the box-like ink cartridge 135 made of synthetic resin, and circular ink feed hopper 135b which can be attached outside tubed connection cylinder part 131b is formed in it at the bottom wall section 135a.

furthermore, an elastic piece band-like to one [among one pair of side-attachment-wall sections 135c and 135g which counter] side-attachment-wall section 135c -- 135d really forms -- having -- the elastic piece -- the height direction which is 135d -- the middle -- while claw part 135e of the shape of a cross-section triangle which can engage with rectangle opening 131e is formed, height 135p to which 135g of side-attachment-wall sections of another side can engage with 131g of rectangle openings is formed in the section.

[0006] And in order to attach an ink cartridge 136 in the head electrode holder 131 As shown in drawing 5 (a), so that height 135p may be made to engage with 131g of rectangle openings first As a height side (it sets to drawing and is right-hand side) is made low, an ink cartridge 135 is leaned, it is made to advance into the head electrode holder 131 and it is shown in drawing 5 (b) Making height 135p engage with 131g of rectangle openings, elastic one side (it sets to drawing and is left-hand side) is dropped, and he makes claw part 135e engage with rectangle opening 131e, and is trying to attach it finally. After operating 135f of control units of 135d of elastic pieces inside and canceling engagement to claw part 135e and rectangle opening 131e, anchoring mentioned above is a reverse order and he is trying to demount an ink cartridge 135 from the head electrode holder 131 on the other hand.

EFFECT OF THE INVENTION

[Effect of the Invention] While according to the attaching structure of the ink cartridge concerning claim 1 preparing an ink feed hopper in the bottom wall section of a box-like ink cartridge and preparing a connection cylinder part in the bottom wall section of a head electrode holder, Since one pair of stop sections were prepared in one pair of side-attachment-wall sections of a head electrode holder and one pair of elastic pieces which have further the engagement section which can engage with the stop section in an ink cartridge were prepared Only by holding an ink cartridge into a level posture and making it descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter It descends, while one pair of elastic pieces of an ink cartridge carry out elastic deformation and contact the side-attachment-wall section of a head electrode holder. Since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0033] According to the attaching structure of the ink cartridge concerning claim 2, the same effectiveness as claim 1 is done so, but without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0034] Although the same effectiveness as claim 1 or claim 2 is done so according to the attaching structure of the ink cartridge concerning claim 3, You can make it simply engaged to rectangle opening which corresponds a claw part since a claw part can really be formed in an elastic piece at the time of shaping while being able to form the stop section easily [the side-attachment-wall section] at the time of shaping, since said stop section is rectangle opening and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece, and the claw part is a longitudinal-section abbreviation triangle-like further.

[0035] Although the same effectiveness as claim 3 is done so according to the attaching structure of the ink cartridge concerning claim 4, Said engagement section is formed in the section in the

middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0036] According to the attaching structure of the ink cartridge concerning claim 5, the same effectiveness as claim 1 is done so, but said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. Since it has the height to which it has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin one pair of the side-attachment-wall sections which counter, and said ink cartridge engages with them possible [the slide to the guide rail], it can detach [holding an ink cartridge into a stable posture] and attach smoothly by making a height meet a corresponding guide rail, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the attaching structure of an ink cartridge [in / as explained based on drawing 5 / a lower part injection type recording mechanism] Since claw part 135e is made to engage with rectangle opening 131e, making it advance into the head electrode holder 131 with the unstable posture which leaned the ink cartridge 135 at the same time it makes height 135p engage with 131g of rectangle openings In the middle of anchoring actuation of an ink cartridge 135, that demount and actuation is complicated and its anchoring actuation, or removal actuation There are problems, such as making the expensive filter 134 attached in connection cylinder part material 131b of the letter of a protrusion hook and damage the corner of an ink cartridge 135.

[0008] The purposes of this invention are anchoring and demounting, being able to simplify actuation and offering [of an ink cartridge] the anchoring and the attaching structure of an ink cartridge which can be detached and attached smoothly, without demounting and making it sometimes collide to each part in a head electrode holder moreover.

MEANS

[Means for Solving the Problem] The attaching structure of the ink cartridge concerning claim 1 It is the attaching structure of the ink cartridge which attaches the box-like ink cartridge which held the ink for record removable from the upper part among one pair of side-attachment-wall sections which were prepared in the head electrode holder of the letter of upper part disconnection, and which counter. The ink feed hopper formed in the bottom wall section of an ink cartridge, and the connection cylinder part which protrudes on the bottom wall section of a head electrode holder, is connected with an ink feed hopper, and supplies the ink of an ink

cartridge to a recording head, It has one pair of elastic pieces which have one pair of stop sections formed in one pair of side-attachment-wall sections which a head electrode holder counters, and the engagement section which can engage with the stop section which are one pair of elastic pieces prepared in the ink cartridge, and corresponds.

[0010] In invention of claim 1, said elastic piece is really formed in an ink cartridge for the attaching structure of the ink cartridge concerning claim 2. In invention of claim 1 or claim 2, said stop section of the attaching structure of the ink cartridge concerning claim 3 is rectangle opening, and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece.

[0011] The control unit for engagement discharge to which the attaching structure of the ink cartridge concerning claim 4 projects above a head electrode holder when said engagement section attaches an ink cartridge in the upper limit section of an elastic piece by being formed in the section in the middle of an elastic piece in invention of claim 3 at a head electrode holder is prepared. The attaching structure of the ink cartridge concerning claim 5 is box-like [in which said head electrode holder contains one pair of side-attachment-wall sections which counter] in invention of claim 1, and has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter, and an ink cartridge has the height engaged possible [the slide to the guide rail].

OPERATION

[Function] In the attaching structure of the ink cartridge concerning claim 1, An ink feed hopper is formed in the bottom wall section of the box-like ink cartridge which held the ink for record. In the bottom wall section of the head electrode holder of the letter of upper part disconnection While the connection cylinder part which is connected with an ink feed hopper and supplies the ink of an ink cartridge to a recording head protrudes, in one pair of side-attachment-wall sections which a head electrode holder counters While one pair of stop sections are formed, to an ink cartridge Since one pair of elastic pieces which have the engagement section which can engage with the corresponding stop section are prepared An ink cartridge is held into a level posture, and if it is made to descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter, one pair of elastic pieces of an ink cartridge will descend, contacting one pair of side-attachment-wall sections of a head electrode holder through the elasticity. And since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively when the connection cylinder part of a head electrode holder is connected with the ink feed hopper of an ink cartridge, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0013] In the attaching structure of the ink cartridge concerning claim 2, although the same operation as claim 1 is done so, without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0014] Although the same operation as claim 1 or claim 2 is done so in the attaching structure of the ink cartridge concerning claim 3, You can make it simply engaged to rectangle opening which corresponds a claw part since a claw part can really be formed in an elastic piece at the time of shaping while being able to form the stop section easily [the side-attachment-wall

section] at the time of shaping, since said stop section is rectangle opening and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece, and the claw part is a longitudinal-section abbreviation triangle-like further.

[0015] Although the same operation as claim 3 is done so in the attaching structure of the ink cartridge concerning claim 4, Said engagement section is formed in the section in the middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0016] Although the same operation as claim 1 is done so in the attaching structure of the ink cartridge concerning claim 5, Said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. It has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter. Said ink cartridge Since it has the height which engages with the guide rail possible [a slide], a height by making a corresponding guide rail meet It can detach and attach smoothly, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder, holding an ink cartridge into a stable posture.

EXAMPLE

[Example] Hereafter, the example of this invention is explained based on a drawing. This example is a thing at the time of applying to the attaching structure of the ink cartridge in the recording mechanism prepared in the ink jet recording apparatus. As shown in drawing 1 , the ink jet recording device 1 establishes fundamentally the form-feed device 10 in which Form P is conveyed horizontally, the carriage drive 20 which drives carriage 21, and the recording mechanism 30 which is made to inject from two or more injection nozzles which prepared the ink held in the ink cartridge 35 in the recording head 32, and is recorded on Form P in the body case 2.

[0018] If the form-feed device 10 is explained, as shown in drawing 1 , to first, the form conveyance direction upstream and the downstream of carriage 21 which are mentioned later One pair of delivery rollers 11 and 12 are arranged by the longitudinal-direction sense, respectively. Each of these delivery rollers 11 and 12 In the right-and-left both ends, it is supported pivotable with the side-attachment-wall plate which is not illustrated, and it drives to a predetermined hand of cut with the roller drive besides illustration, and the form P to which paper was fed is conveyed to an abbreviation horizontal direction the migration direction and the letter of a rectangular cross of carriage 21 immediately through the carriage 21 bottom.

[0019] Next, the carriage drive 20 is explained based on drawing 1 , drawing 2 , and drawing 4 . The abbreviation tabular carriage 21 is arranged horizontally, and the carriage 21 is supported free [longitudinal-direction migration] in the front end section by form conveyance path immediately the bottom with the guide rod 22 and the guide rail 23 arranged in parallel while it is supported free [longitudinal-direction migration] in the back end section by the delivery

rollers 11 and 12 and the guide rod 22 arranged in parallel. These guide rods 22 and a guide rail 23 are supported with the side-attachment-wall plates 4 and 5 in the right-and-left both ends, respectively.

[0020] on the other hand, the driving pulley 25 attached in the driving shaft of the carriage drive motor 26 is formed, the endless-like timing belt 27 covers both [these] the pulleys 24 and 25, it is built [the left end section of the successive range of carriage 21 is resembled as if the follower pulley 24 is supported pivotably pivotable by the frame besides illustration, and] at that right end section, and it connects with this timing belt 27 in the lower limit section of carriage 21. And if the rotation drive of the carriage drive motor 26 is carried out, through both [these] the pulleys 24 and 25 and a timing belt 27, carriage 21 will be supported by these guide rods 22 and the guide rail 23, and a migration drive will be carried out in the record direction (right) and the anti-record direction (left).

[0021] Next, it is laid in carriage 21 and the recording mechanism 30 recorded on Form P by injection of ink is explained based on drawing 1 - drawing 4 . On said carriage 21, the box-like head electrode holder 31 of the letter of upper part disconnection has fixed. While the recording head 32 in which two or more ink supply way 32a corresponding to two or more injection nozzles was formed is attached in the back end section side of the bottom wall section 31a bottom of the head electrode holder 31, tubed connection cylinder part (so-called manifold) 31b projected up is formed in the center section of the bottom wall section 31a. That is, an abbreviation lower part is made to inject ink and recording heads 32 are consisted of by the lower part injection type recorded on the form P horizontally conveyed immediately to the down side.

[0022] While ink path 31c which is open for free passage to a recording head 32 is formed, the interior of the connection cylinder part 31b is equipped with the seal member 33 made of rubber in order that the outside of the connection cylinder part 31b may prevent ink leakage. In order to remove the dust contained in the ink supplied, the filter 34 which knit the stainless steel wire rod with a diameter of several microns reticulated is attached in the upper limit of the connection cylinder part 31b. The long rectangle openings 31e and 31g are formed in the longitudinal direction which is the stop section at the section near the upper limit of one pair of side-attachment-wall sections 31e and 31f which were prepared before and after said head electrode holder 31 and which counter, respectively. Furthermore, inside one pair of side-attachment-wall sections 31h and 31j which were prepared in right and left of the head electrode holder 31 and which counter, the guide rails 31i and 31k which have the predetermined width of face prolonged in the vertical direction are formed, respectively.

[0023] Said ink cartridge 35 is box-like [removable in the head electrode holder 31 / made of synthetic resin], and the ink hold material 36 which consists of urethane foam which the ink for record was made to fully permeate is formed in the interior. Moreover, circular ink feed hopper 35b which can be attached outside connection cylinder part 32b is formed in the center section of bottom wall section 35a of an ink cartridge 35. The elastic pieces [of the predetermined width of face which has elasticity and is prolonged up / 35d and 35h] lower limit section is formed in the section near the lower limit of one pair of side-attachment-wall sections 35c and 35g which were prepared before and after the ink cartridge 35 and which counter in one, respectively.

[0024] and the each elastic pieces [35d and 35h] height direction -- the middle -- while the claw parts 35e and 35i of the shape of a longitudinal-section abbreviation triangle which is the engagement section are formed, respectively, when an ink cartridge 35 is attached in the head electrode holder 31, the control units 35f and 35j for engagement discharge which project above the head electrode holder 31 are formed in the each elastic pieces [35d and 35h] upper limit

section at the section, respectively. Furthermore, the heights 35l and 35n prolonged in the vertical direction which engages with the corresponding guide rails 31i and 31k formed in the side-attachment-wall sections 31h and 31j of the head electrode holder 31 possible [a slide] are formed in the outside of one pair of side-attachment-wall sections 35k and 35m which counter established in right and left of an ink cartridge 35, respectively.

[0025] Next, the operation when attaching an ink cartridge 35 in the head electrode holder 31 is explained based on drawing 3 and drawing 4 . First, the elastic pieces 35d and 35h are the sense corresponding to the rectangle openings 31e and 31g, moreover, hold an ink cartridge 35 into a level posture, and make it descend from the upper part in the head electrode holder 31, as shown in drawing 4 . An ink cartridge 35 can be made to advance into the head electrode holder 31 by making these heights 35l and 35n engage with the corresponding guide rails 31i and 31k, and sliding them at this time, being able to position an ink cartridge 35 to a cross direction and a longitudinal direction, and holding it to a stable horizontal position.

[0026] At this time, one pair of elastic pieces 35d and 35h of an ink cartridge 35 descend, contacting one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31 through that elasticity, respectively. And as shown in drawing 3 , when connection cylinder part 32b of the head electrode holder 31 is connected with ink feed hopper 35b of an ink cartridge 35, it can engage with the rectangle openings 31e and 31g to which the claw parts 35e and 35i prepared in the elastic pieces 35d and 35h are equivalent certainly respectively automatically, and an ink cartridge 35 can be attached in the head electrode holder 31.

[0027] At this time, the upper limit section of connection cylinder part 32b inserts in ink feed hopper 35b, and contacts the ink hold material 36 in the shape of press from a lower part. Thereby, the ink of the ink hold material 36 is supplied to a recording head 32 through ink supply way 32a of connection cylinder part 32b. Here, when the seal member 33 is pressed by ink feed hopper 35b in the shape of adhesion, it is prevented that the ink of the ink hold material 36 leaks outside.

[0028] On the other hand, as shown in drawing 3 , when the ink cartridge 35 is attached in the head electrode holder 31 Operate the control units 35f and 35j of each other prepared in the elastic pieces 35d and 35h inside, and by carrying out elastic deformation of each elastic pieces 35d and 35h, as a two-dot chain line shows Engagement to the claw parts 35e and 35i and the rectangle openings 31e and 31g which were prepared in the elastic pieces 35d and 35h can be canceled easily, and, moreover, an ink cartridge 35 can be demounted upwards in the state of the anchoring posture.

[0029] Thus, while preparing ink feed hopper 35b in bottom wall section 35a of the box-like ink cartridge 35 and preparing connection cylinder part 32b in bottom wall section 31a of the head electrode holder 31 One pair of rectangle openings 31e and 31g are formed in one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31. Furthermore, since one pair of elastic pieces 35d and 35h which have the claw parts 35e and 35i which can engage with the rectangle openings 31e and 31g were formed in one pair of side-attachment-wall sections 35c and 35g of an ink cartridge 35 Only by holding an ink cartridge 35 into a level posture, and making it descend from the upper part in the head electrode holder 31 It descends, while one pair of elastic pieces 35d and 35h of an ink cartridge 35 carry out elastic deformation and contact the side-attachment-wall sections 31d and 31f. From engaging with the rectangle openings 31e and 31g to which the elastic pieces [35d and 35h] claw parts 35e and 35i are equivalent automatically, respectively It can attach easily [the head electrode holder 31], without making an ink cartridge 35 collide with each part, such as the filter 34 of the head electrode holder 31.

[0030] By furthermore, the thing which the elastic pieces [35d and 35h] control units 35f and

35j of each other are operated inside, and is done for the elastic deformation of each elastic pieces 35d and 35h when the ink cartridge 35 is attached in the head electrode holder 31. Engagement to claw parts 35e and 35i and the rectangle openings 31e and 31g can be canceled easily, and it can demount simply and smoothly only by moreover pulling up an ink cartridge 35 upwards in the state of the anchoring posture, without making it collide with each part of the head electrode holder 31.

[0031] In addition, said head electrode holder 31 may be attaching structure which you may have only one pair of side-attachment-wall sections 31d and 31f which counter, and the head electrode holder 31 is attached on carriage 21 in the shape of an inclination, and is attached in the direction of slant to the head electrode holder 31. Furthermore, the elastic pieces 35d and 35h of an ink cartridge 35 may be formed so that it may extend up in the shape of U character from bottom wall section 35a, and they may be formed two or more pairs not only in one pair. In addition, based on an obvious technique, various modification can be added to an existing technique and this existing contractor about said example.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline perspective view of the ink jet recording device concerning the example of this invention.

[Drawing 2] It is the part plan of an ink jet recording device.

[Drawing 3] It is the A-A line vertical section side elevation of drawing 2.

[Drawing 4] It is the decomposition perspective view of a head holder and an ink cartridge.

[Drawing 5] Starting the conventional technique, (a) is the important section vertical section side elevation showing the condition of attaching an ink cartridge in a head electrode holder, and (b) is (a) considerable Fig. in the condition of having attached the ink cartridge in the head electrode holder.

[Description of Notations]

1 Ink Jet Recording Device

30 Recording Mechanism

31 Head Electrode Holder

31a Bottom wall section

31b Connection cylinder part

31d Side-attachment-wall section

31e Rectangle opening

31f Side-attachment-wall section

31g Rectangle opening

31h Side-attachment-wall section

31i Guide rail

31j Side-attachment-wall section

31k Guide rail

35 Ink Cartridge

35a Bottom wall section

35b Ink feed hopper

35c Side-attachment-wall section

35d Elastic piece

35e Claw part
35f Control unit
35g Side-attachment-wall section
35h Elastic piece
35i Claw part
35j Control unit
35k Side-attachment-wall section
35l. Height
35m Side-attachment-wall section
35n Height

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[Title of the Invention] Attaching structure of an ink cartridge

[Claim(s)]

[Claim 1] It is the attaching structure of the ink cartridge which attaches the box-like ink cartridge which held the ink for record removable from the upper part among one pair of side-attachment-wall sections which were prepared in the head electrode holder of the letter of upper part disconnection, and which counter,

The ink feed hopper formed in the bottom wall section of said ink cartridge,
The connection section which is prepared in the bottom wall section of said head electrode holder, is connected with said ink feed hopper, and supplies the ink of said ink cartridge to a recording head,

One pair of stop sections formed in one pair of side-attachment-wall sections which said head electrode holder counters,

One pair of elastic pieces which have the engagement section which can engage with the stop section which are one pair of elastic pieces prepared in one pair of side-attachment-wall sections which said ink cartridge counters, and corresponds,

Attaching structure of the ink cartridge characterized by preparation *****.

[Claim 2] Said elastic piece is the attaching structure of the ink cartridge according to claim 1 characterized by really being formed in said ink cartridge.

[Claim 3] It is the attaching structure of the ink cartridge according to claim 1 or 2 which said stop section is rectangle opening and is characterized by said engagement section being a claw part of the shape of a longitudinal-section triangle really formed in said elastic piece.

[Claim 4] Said engagement section is the attaching structure of the ink cartridge according to claim 1 characterized by preparing the control unit for engagement discharge which projects above said head electrode holder when it is formed in the section in the middle of an elastic piece and said ink cartridge is attached in the upper limit section of an elastic piece at a head electrode holder.

[Claim 5] Said head electrode holder is the attaching structure of the ink cartridge according to claim 1 which has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which are box-like [containing said one pair of side-attachment-wall sections which counter], and adjoin said one pair of side-attachment-wall sections which counter, and is characterized by said ink cartridge having the height engaged possible [the slide to the guide rail].

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the thing which especially an ink cartridge is dropped to a straight lower part, and enabled it to attach it simply in the head electrode holder of the letter of upper part disconnection about the attaching structure of the ink cartridge which held the ink for record.

[0002]

[Description of the Prior Art] In the ink jet recording device which is made to inject ink conventionally from two or more injection nozzles prepared in the recording head, and records an alphabetic character and an image on a form, While holding the ink for record which the tubed connection cylinder part (the so-called manifold) which formed in the head electrode holder the ink supply way which is open for free passage to a recording head is formed while the recording head of the letter of opposite is prepared in a form at a head electrode holder, and is supplied to a recording head, it equips with the ink cartridge which prepared the ink feed hopper removable.

[0003] By the way, it is with this kind of ink jet recording device, While the tubed connection cylinder part which is open for free passage to a recording head and its recording head is generally attached in the perpendicular wall of the head electrode holder prepared in the abbreviation level condition By attaching in an abbreviation horizontal direction the ink cartridge which has the ink feed hopper which can be attached outside the connection cylinder part in the side-attachment-wall section to a head electrode holder As opposed to the form to which supplies

the ink of an ink cartridge to a recording head through a connection cylinder part, and paper is fed in the direction of a vertical While the recording mechanism of the level injection type which an abbreviation horizontal direction is made to inject ink and records it from a recording head is generally used In recording in the section in the middle of the form conveyance path of an abbreviation horizontal direction if a recording head and a connection cylinder part are attached in the bottom wall section of the box-like head electrode holder of the letter of upper part disconnection -- being also alike -- As opposed to the form to which attaches the ink cartridge which has the ink feed hopper attached outside the connection cylinder part in the bottom wall section from the upper part in a head electrode holder, and paper is fed horizontally The recording mechanism of the lower part injection type which an abbreviation lower part is made to inject ink and records it from a recording head is also put in practical use.

[0004] As the attaching structure of the ink cartridge in the lower part injection type of recording mechanism, As shown in drawing 5, for example, to bottom wall section 131a of the box-like head electrode holder 131 of the letter of upper part disconnection While the recording head 132 in which two or more injection nozzles were formed is attached Tubed connection cylinder part (manifold) 131b which has ink path 131c which is open for free passage to the recording head 132 is formed in the inside in the shape of a protrusion. To the connection cylinder part 131b The seal member 133 made of the rubber for ink leakage prevention is attached, and the filter 134 of the shape of a fine stitch from which the dust contained in ink is removed is further attached in the point. Furthermore, the rectangle openings 131e and 131g are formed in one pair of side-attachment-wall sections 131d and 131f which counter, respectively.

[0005] On the other hand, the ink hold material 136 which consists of porous materials, such as urethane foam which made the ink for record absorb enough, is formed in the box-like ink cartridge 135 made of synthetic resin, and circular ink feed hopper 135b which can be attached outside tubed connection cylinder part 131b is formed in it at the bottom wall section 135a. furthermore, an elastic piece band-like to one [among one pair of side-attachment-wall sections 135c and 135g which counter] side-attachment-wall section 135c -- 135d really forms -- having -- the elastic piece -- the height direction which is 135d -- the middle -- while claw part 135e of the shape of a cross-section triangle which can engage with rectangle opening 131e is formed, height 135p to which 135g of side-attachment-wall sections of another side can engage with 131g of rectangle openings is formed in the section.

[0006] And it is in order to attach an ink cartridge 136 in the head electrode holder 131, As shown in drawing 5 (a), so that height 135p may be made to engage with 131g of rectangle openings first As a height side (it sets to drawing and is right-hand side) is made low, an ink cartridge 135 is leaned, it is made to advance into the head electrode holder 131 and it is shown in drawing 5 (b) Making height 135p engage with 131g of rectangle openings, elastic one side (it sets to drawing and is left-hand side) is dropped, and he makes claw part 135e engage with rectangle opening 131e, and is trying to attach it finally. After operating 135f of control units of 135d of elastic pieces inside and canceling engagement to claw part 135e and rectangle opening 131e, anchoring mentioned above is a reverse order and he is trying to demount an ink cartridge 135 from the head electrode holder 131 on the other hand.

[0007]

[Problem(s) to be Solved by the Invention] In the attaching structure of an ink cartridge [in / as explained based on drawing 5 / a lower part injection type recording mechanism] Since claw part 135e is made to engage with rectangle opening 131e, making it advance into the head electrode holder 131 with the unstable posture which leaned the ink cartridge 135 at the same time it makes height 135p engage with 131g of rectangle openings In the middle of anchoring

actuation of an ink cartridge 135, that demount and actuation is complicated and its anchoring actuation, or removal actuation There are problems, such as making the expensive filter 134 attached in connection cylinder part material 131b of the letter of a protrusion hook and damage the corner of an ink cartridge 135.

[0008] The purposes of this invention are anchoring and demounting, being able to simplify actuation and offering [of an ink cartridge] the anchoring and the attaching structure of an ink cartridge which can be detached and attached smoothly, without demounting and making it sometimes collide to each part in a head electrode holder moreover.

[0009]

[Means for Solving the Problem] The attaching structure of the ink cartridge concerning claim 1 It is the attaching structure of the ink cartridge which attaches the box-like ink cartridge which held the ink for record removable from the upper part among one pair of side-attachment-wall sections which were prepared in the head electrode holder of the letter of upper part disconnection, and which counter. The ink feed hopper formed in the bottom wall section of an ink cartridge, and the connection section which is prepared in the bottom wall section of a head electrode holder, is connected with an ink feed hopper, and supplies the ink of an ink cartridge to a recording head, It is one pair of elastic pieces prepared in one pair of stop sections formed in one pair of side-attachment-wall sections which a head electrode holder counters, and one pair of side-attachment-wall sections which an ink cartridge counters, and has one pair of elastic pieces which have the engagement section which can engage with the corresponding stop section.

[0010] In invention of claim 1, said elastic piece is really formed in said ink cartridge for the attaching structure of the ink cartridge concerning claim 2. In invention of claim 1 or claim 2, said stop section of the attaching structure of the ink cartridge concerning claim 3 is rectangle opening, and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at said elastic piece.

[0011] The control unit for engagement discharge to which the attaching structure of the ink cartridge concerning claim 4 projects above said head electrode holder when said engagement section attaches an ink cartridge in the upper limit section of said elastic piece in invention of claim 1 at a head electrode holder by being formed in the section in the middle of said elastic piece is prepared. The attaching structure of the ink cartridge concerning claim 5 is box-like [in which said head electrode holder contains one pair of side-attachment-wall sections which counter] in invention of claim 1, and has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter, and an ink cartridge has the height engaged possible [the slide to the guide rail].

[0012]

[Function] In the attaching structure of the ink cartridge concerning claim 1, An ink feed hopper is formed in the bottom wall section of the box-like ink cartridge which held the ink for record. In the bottom wall section of the head electrode holder of the letter of upper part disconnection While the connection cylinder part which is connected with an ink feed hopper and supplies the ink of an ink cartridge to a recording head protrudes, in one pair of side-attachment-wall sections which a head electrode holder counters While one pair of stop sections are formed, to an ink cartridge Since one pair of elastic pieces which have the engagement section which can engage with the corresponding stop section are prepared An ink cartridge is held into a level posture, and if it is made to descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter, one pair of elastic pieces of an ink cartridge will descend, contacting one pair of side-attachment-wall sections of a head electrode

holder through the elasticity. And since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively when the connection cylinder part of a head electrode holder is connected with the ink feed hopper of an ink cartridge, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0013] In the attaching structure of the ink cartridge concerning claim 2, although the same operation as claim 1 is done so, without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0014] Although the same operation as claim 1 or claim 2 is done so in the attaching structure of the ink cartridge concerning claim 3, You can make it simply engaged to rectangle opening which corresponds a claw part since a claw part can really be formed in an elastic piece at the time of shaping while being able to form the stop section easily [the side-attachment-wall section] at the time of shaping, since said stop section is rectangle opening and said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece, and the claw part is a longitudinal-section abbreviation triangle-like further.

[0015] Although the same operation as claim 1 is done so in the attaching structure of the ink cartridge concerning claim 4, Said engagement section is formed in the section in the middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0016] Although the same operation as claim 1 is done so in the attaching structure of the ink cartridge concerning claim 5, Said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. It has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin said one pair of side-attachment-wall sections which counter. Said ink cartridge Since it has the height which engages with the guide rail possible [a slide], a height by making a corresponding guide rail meet It can detach and attach smoothly, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder, holding an ink cartridge into a stable posture.

[0017]

[Example] Hereafter, the example of this invention is explained based on a drawing. This example is a thing at the time of applying to the attaching structure of the ink cartridge in the recording mechanism prepared in the ink jet recording apparatus. As shown in drawing 1, the ink jet recording device 1 establishes fundamentally the form-feed device 10 in which Form P is conveyed horizontally, the carriage drive 20 which drives carriage 21, and the recording mechanism 30 which is made to inject from two or more injection nozzles which prepared the ink held in the ink cartridge 35 in the recording head 32, and is recorded on Form P in the body case 2.

[0018] First, if the form-feed device 10 is explained, it is supported pivotable with the side-attachment-wall plate which is not illustrated [in / one pair of delivery rollers 11 and 12 are arranged in the form conveyance direction upstream and the downstream of carriage 21 which

are later mentioned as shown in drawing 1 by the longitudinal-direction sense, respectively, and / the right-and-left both ends], and each of these delivery rollers 11 and 12 is a roller drive besides illustration. It drives to a predetermined hand of cut, and the form P to which paper was fed is conveyed to an abbreviation horizontal direction the migration direction and the letter of a rectangular cross of carriage 21 immediately through the carriage 21 bottom.

[0019] Next, the carriage drive 20 is explained based on drawing 1, drawing 2, and drawing 4. The abbreviation tabular carriage 21 is arranged horizontally, and the carriage 21 is supported free [longitudinal-direction migration] in the front end section by form conveyance path immediately the bottom with the guide rod 22 and the guide rail 23 arranged in parallel while it is supported free [longitudinal-direction migration] in the back end section by the delivery rollers 11 and 12 and the guide rod 22 arranged in parallel. These guide rods 22 and a guide rail 23 are supported with the side-attachment-wall plates 4 and 5 in the right-and-left both ends, respectively.

[0020] on the other hand, the driving pulley 25 attached in the driving shaft of the carriage drive motor 26 is formed, the endless-like timing belt 27 covers both [these] the pulleys 24 and 25, it is built [the left end section of the successive range of carriage 21 is resembled as if the follower pulley 24 is supported pivotably pivotable by the frame besides illustration, and] at that right end section, and it connects with this timing belt 27 in the lower limit section of carriage 21. And if the rotation drive of the carriage drive motor 26 is carried out, through both [these] the pulleys 24 and 25 and a timing belt 27, carriage 21 will be supported by these guide rods 22 and the guide rail 23, and a migration drive will be carried out in the record direction (right) and the anti-record direction (left).

[0021] Next, it is laid in carriage 21 and the recording mechanism 30 recorded on Form P by injection of ink is explained based on drawing 1 - drawing 4. On said carriage 21, the box-like head electrode holder 31 of the letter of upper part disconnection has fixed. While the recording head 32 in which two or more ink supply way 32a corresponding to two or more injection nozzles was formed is attached in the back end section side of the bottom wall section 31a bottom of the head electrode holder 31, tubed connection cylinder part (so-called manifold) 31b projected up is formed in the center section of the bottom wall section 31a. That is, an abbreviation lower part is made to inject ink and recording heads 32 are consisted of by the lower part injection type recorded on the form P horizontally conveyed immediately to the down side.

[0022] While ink path 31c which is open for free passage to a recording head 32 is formed, the interior of the connection cylinder part 31b is equipped with the seal member 33 made of rubber in order that the outside of the connection cylinder part 31b may prevent ink leakage. In order to remove the dust contained in the ink supplied, the filter 34 which knit the stainless steel wire rod with a diameter of several microns reticulated is attached in the upper limit of the connection cylinder part 31b. The long rectangle openings 31e and 31g are formed in the longitudinal direction which is the stop section at the section near the upper limit of one pair of side-attachment-wall sections 31e and 31f which were prepared before and after said head electrode holder 31 and which counter, respectively. Furthermore, inside one pair of side-attachment-wall sections 31h and 31j which were prepared in right and left of the head electrode holder 31 and which counter, the guide rails 31i and 31k which have the predetermined width of face prolonged in the vertical direction are formed, respectively.

[0023] Said ink cartridge 35 is box-like [removable in the head electrode holder 31 / made of synthetic resin], and the ink hold material 36 which consists of urethane foam which the ink for record was made to fully permeate is formed in the interior. Moreover, circular ink feed hopper

35b which can be attached outside connection cylinder part 32b is formed in the center section of bottom wall section 35a of an ink cartridge 35. The elastic pieces [of the predetermined width of face which has elasticity and is prolonged up / 35d and 35h] lower limit section is formed in the section near the lower limit of one pair of side-attachment-wall sections 35c and 35g which were prepared before and after the ink cartridge 35 and which counter in one, respectively.

[0024] and the each elastic pieces [35d and 35h] height direction -- the middle -- while the claw parts 35e and 35i of the shape of a longitudinal-section abbreviation triangle which is the engagement section are formed, respectively, when an ink cartridge 35 is attached in the head electrode holder 31, the control units 35f and 35j for engagement discharge which project above the head electrode holder 31 are formed in the each elastic pieces [35d and 35h] upper limit section at the section, respectively. Furthermore, the heights 35l and 35n prolonged in the vertical direction which engages with the corresponding guide rails 31i and 31k formed in the side-attachment-wall sections 31h and 31j of the head electrode holder 31 possible [a slide] are formed in the outside of one pair of side-attachment-wall sections 35k and 35m which counter established in right and left of an ink cartridge 35, respectively.

[0025] Next, the operation when attaching an ink cartridge 35 in the head electrode holder 31 is explained based on drawing 3 and drawing 4. First, the elastic pieces 35d and 35h are the sense corresponding to the rectangle openings 31e and 31g, moreover, hold an ink cartridge 35 into a level posture, and make it descend from the upper part in the head electrode holder 31, as shown in drawing 4. An ink cartridge 35 can be made to advance into the head electrode holder 31 by making these heights 35l and 35n engage with the corresponding guide rails 31i and 31k, and sliding them at this time, being able to position an ink cartridge 35 to a cross direction and a longitudinal direction, and holding it to a stable horizontal position.

[0026] At this time, one pair of elastic pieces 35d and 35h of an ink cartridge 35 descend, contacting one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31 through that elasticity, respectively. And as shown in drawing 3, when connection cylinder part 32b of the head electrode holder 31 is connected with ink feed hopper 35b of an ink cartridge 35, it can engage with the rectangle openings 31e and 31g to which the claw parts 35e and 35i prepared in the elastic pieces 35d and 35h are equivalent certainly respectively automatically, and an ink cartridge 35 can be attached in the head electrode holder 31.

[0027] At this time, the upper limit section of connection cylinder part 32b inserts in ink feed hopper 35b, and contacts the ink hold material 36 in the shape of press from a lower part. Thereby, the ink of the ink hold material 36 is supplied to a recording head 32 through ink supply way 32a of connection cylinder part 32b. Here, when the seal member 33 is pressed by ink feed hopper 35b in the shape of adhesion, it is prevented that the ink of the ink hold material 36 leaks outside.

[0028] On the other hand, as shown in drawing 3, when the ink cartridge 35 is attached in the head electrode holder 31, the control units 35f and 35j of each other prepared in the elastic pieces 35d and 35h are operated inside. By carrying out elastic deformation of each elastic pieces 35d and 35h, as a two-dot chain line shows, engagement to the claw parts 35e and 35i and the rectangle openings 31e and 31g which were prepared in the elastic pieces 35d and 35h can be canceled easily, and, moreover, an ink cartridge 35 can be demounted upwards in the state of the anchoring posture.

[0029] While preparing ink feed hopper 35b in bottom wall section 35a of the box-like ink cartridge 35 and preparing connection cylinder part 32b in bottom wall section 31a of the head electrode holder 31 in this way, One pair of rectangle openings 31e and 31g are formed in one pair of side-attachment-wall sections 31d and 31f of the head electrode holder 31. Furthermore,

since one pair of elastic pieces 35d and 35h which have the claw parts 35e and 35i which can engage with the rectangle openings 31e and 31g were formed in one pair of side-attachment-wall sections 35c and 35g of an ink cartridge 35. Only by holding an ink cartridge 35 into a level posture, and making it descend from the upper part in the head electrode holder 31. It descends, while one pair of elastic pieces 35d and 35h of an ink cartridge 35 carry out elastic deformation and contact the side-attachment-wall sections 31d and 31f. From engaging with the rectangle openings 31e and 31g to which the elastic pieces [35d and 35h] claw parts 35e and 35i are equivalent automatically, respectively. It can attach easily [the head electrode holder 31], without making an ink cartridge 35 collide with each part, such as the filter 34 of the head electrode holder 31.

[0030] Furthermore, when the ink cartridge 35 is attached in the head electrode holder 31, it is operating the elastic pieces [35d and 35h] control units 35f and 35j of each other inside, and carrying out elastic deformation of each elastic pieces 35d and 35h. Engagement to claw parts 35e and 35i and the rectangle openings 31e and 31g can be canceled easily, and it can demount simply and smoothly only by moreover pulling up an ink cartridge 35 upwards in the state of the anchoring posture, without making it collide with each part of the head electrode holder 31.

[0031] In addition, said head electrode holder 31 may be attaching structure which you may have only one pair of side-attachment-wall sections 31d and 31f which counter, and the head electrode holder 31 is attached on carriage 21 in the shape of an inclination, and is attached in the direction of slant to the head electrode holder 31. Furthermore, the elastic pieces 35d and 35h of an ink cartridge 35 may be formed so that it may extend up in the shape of U character from bottom wall section 35a, and they may be formed two or more pairs not only in one pair. In addition, based on an obvious technique, various modification can be added to an existing technique and this existing contractor about said example.

[0032]

[Effect of the Invention] While according to the attaching structure of the ink cartridge concerning claim 1 preparing an ink feed hopper in the bottom wall section of a box-like ink cartridge and preparing a connection cylinder part in the bottom wall section of a head electrode holder, Since one pair of stop sections were prepared in one pair of side-attachment-wall sections of a head electrode holder and one pair of elastic pieces which have further the engagement section which can engage with the stop section in an ink cartridge were prepared. Only by holding an ink cartridge into a level posture and making it descend from the upper part among one pair of side attachment walls which were prepared in the head electrode holder and which counter. It descends, while one pair of elastic pieces of an ink cartridge carry out elastic deformation and contact the side-attachment-wall section of a head electrode holder. Since it engages with the stop section to which the claw part prepared in the elastic piece corresponds, respectively, it can attach easily [a head electrode holder], without making an ink cartridge collide with each part of a head electrode holder.

[0033] According to the attaching structure of the ink cartridge concerning claim 2, the same effectiveness as claim 1 is done so, but without manufacturing an elastic piece as another components, since it is really formed in the ink cartridge, said elastic piece can exclude the activity to attach and can manufacture an ink cartridge with an elastic piece easily.

[0034] Although the same effectiveness as claim 1 or claim 2 is done so according to the attaching structure of the ink cartridge concerning claim 3, You can make it simply engaged to rectangle opening which corresponds a claw part since a claw part can really be formed in an elastic piece at the time of shaping while being able to form the stop section easily [the side-attachment-wall section] at the time of shaping, since said stop section is rectangle opening and

said engagement section is really a formation **** longitudinal-section abbreviation triangle-like claw part at an elastic piece, and the claw part is a longitudinal-section abbreviation triangle-like further.

[0035] Although the same effectiveness as claim 1 is done so according to the attaching structure of the ink cartridge concerning claim 4, Said engagement section is formed in the section in the middle of an elastic piece. In the upper limit section of an elastic piece Since the control unit for engagement discharge which projects above a head electrode holder is prepared when an ink cartridge is attached in a head electrode holder By operating these control units of each other inside, and carrying out elastic deformation of the elastic piece, when the ink cartridge is attached in the head electrode holder Since engagement to the claw part and rectangle opening which were prepared in the elastic piece can be canceled easily and an ink cartridge is moreover only pulled up upwards in the state of the anchoring posture, it can demount from a head electrode holder simply and smoothly single hand, without making it collide with each part of a head electrode holder.

[0036] According to the attaching structure of the ink cartridge concerning claim 5, the same effectiveness as claim 1 is done so, but said head electrode holder is box-like [containing said one pair of side-attachment-wall sections which counter]. Since it has the height to which it has the guide rail prolonged in the vertical direction in one pair of side-attachment-wall sections of the others which adjoin one pair of the side-attachment-wall sections which counter, and said ink cartridge engages with them possible [the slide to the guide rail], it can detach [holding an ink cartridge into a stable posture] and attach smoothly by making a height meet a corresponding guide rail, without making an ink cartridge collide with each part of a head electrode holder to a head electrode holder.

[Brief Description of the Drawings]

[Drawing 1] It is the outline perspective view of the ink jet recording device concerning the example of this invention.

[Drawing 2] It is the part plan of an ink jet recording device.

[Drawing 3] It is the A-A line vertical section side elevation of drawing 2.

[Drawing 4] It is the decomposition perspective view of a head holder and an ink cartridge.

[Drawing 5] Starting the conventional technique, (a) is the important section vertical section side elevation showing the condition of attaching an ink cartridge in a head electrode holder, and (b) is (a) considerable Fig. in the condition of having attached the ink cartridge in the head electrode holder.

[Description of Notations]

1 Ink Jet Recording Device

30 Recording Mechanism

31 Head Electrode Holder

31a Bottom wall section

31b Connection cylinder part

31d Side-attachment-wall section

31e Rectangle opening

31f Side-attachment-wall section

31g Rectangle opening

31h Side-attachment-wall section

31i Guide rail

31j Side-attachment-wall section

31k Guide rail

35 Ink Cartridge
35a Bottom wall section
35b Ink feed hopper
35c Side-attachment-wall section
35d Elastic piece
35e Claw part
35f Control unit
35g Side-attachment-wall section
35h Elastic piece
35i Claw part
35j Control unit
35k Side-attachment-wall section
35l. Height
35m Side-attachment-wall section
35n Height

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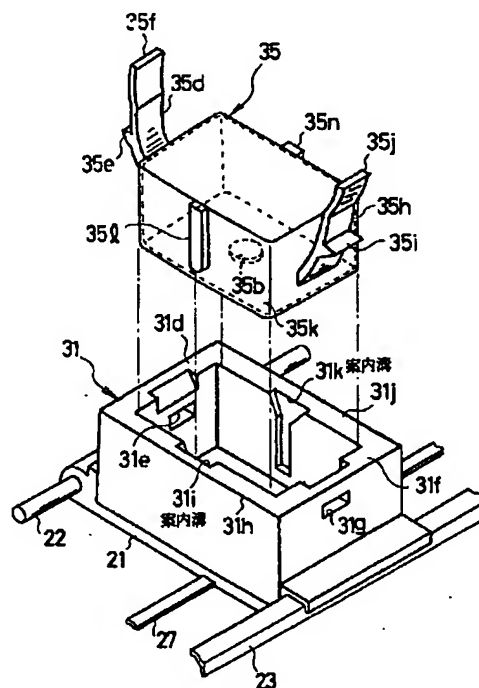
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(54)【発明の名称】 インクカートリッジの取付け構造

(57)【要約】

【目的】 キャリッジに装着したヘッドホルダーに対し、インクカートリッジを容易に取付け及び取外することができるようにする。

【構成】 キャリッジ21に装着したヘッドホルダー31は、1対の側壁部に開口部31e、31gを、他の1対の側壁部に案内溝31i、31kを有する。インクカートリッジ35は1対の側壁部に上記開口部と係合する爪部35e、35iを持つ弾性片35d、35hを、他の1対の側壁部に案内溝と係合する突起部35l、35nを有する。インクカートリッジ35は、弾性片を持ってヘッドホルダー31に対しまっすぐに上下させることで、取付けまたは取外することができる。



【特許請求の範囲】

【請求項1】 記録用のインクを収容した箱状のインクカートリッジを、上方開放状のヘッドホルダーに設けた対向する1対の側壁部間に上方から着脱可能に取付けるインクカートリッジの取付け構造であって、前記インクカートリッジの底壁部に形成されたインク供給口と、前記ヘッドホルダーの底壁部に突設され、インク供給口に連結されてインクカートリッジのインクを記録ヘッドに供給する連結筒部と、前記ヘッドホルダーの対向する1対の側壁部に形成された1対の係止部と、前記インクカートリッジに設けられた1対の弾性片であって、対応する係止部に係合可能な係合部を有する1対の弾性片と、を備えたことを特徴とするインクカートリッジの取付け構造。

【請求項2】 前記弾性片は、インクカートリッジに一体形成されたことを特徴とする請求項1に記載のインクカートリッジの取付け構造。

【請求項3】 前記係止部は矩形開口部であり、前記係合部は、弾性片に一体形成された縦断面略三角形の爪部であることを特徴とする請求項1又は請求項2に記載のインクカートリッジの取付け構造。

【請求項4】 前記係合部は弾性片の途中部に形成され、弾性片の上端部には、インクカートリッジをヘッドホルダーに取付けたときに、ヘッドホルダーよりも上側に突出する係合解除用の操作部が設けられたことを特徴とする請求項3に記載のインクカートリッジの取付け構造。

【請求項5】 前記ヘッドホルダーは、前記1対の対向する側壁部を含む箱状であり、前記1対の側壁部に隣接する他の1対の対向する側壁部に上下方向に延びる案内溝を有し、前記インクカートリッジは、その案内溝にスライド可能に係合する突起部を有することを特徴とする請求項1に記載のインクカートリッジの取付け構造。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、記録用のインクを収容したインクカートリッジの取付け構造に関し、特にインクカートリッジを真直ぐ下方に下降させて上方開放状のヘッドホルダー内に簡単に取付けできるようにしたものに関する。

【0002】

【従来の技術】従来、記録ヘッドに設けた複数の噴射ノズルからインクを噴射させて、文字や画像を用紙に記録するインクジェット記録装置においては、用紙に対向状の記録ヘッドはヘッドホルダーに設けられるとともに、そのヘッドホルダーには、記録ヘッドに連通するインク供給路を形成した筒状の連結筒部（所謂マニホールド）

が形成され、また記録ヘッドに供給する記録用のインクを収容するとともに、インク供給口を設けたインクカートリッジを着脱可能に装着するようになっている。

【0003】ところで、この種のインクジェット記録装置では、一般に、略水平状態に設けられたヘッドホルダーの垂直壁部に、記録ヘッドとその記録ヘッドに連通する筒状の連結筒部とが取付けられるとともに、その連結筒部に外嵌可能なインク供給口を側壁部に有するインクカートリッジを、ヘッドホルダーに対して略水平方向に取付けることで、インクカートリッジのインクを連結筒部を介して記録ヘッドに供給するようし、鉛直方向に給紙される用紙に対して、記録ヘッドからインクを略水平方向に噴射させて記録する水平噴射タイプの記録機構が一般的に用いられている一方、略水平方向の用紙搬送経路の途中部において記録する場合には、上方開放状の箱状のヘッドホルダーの底壁部に記録ヘッドと連結筒部とが取付けられるとともに、その連結筒部に外嵌するインク供給口を底壁部に有するインクカートリッジを、ヘッドホルダー内に上方から取付けるようし、水平方向に給紙される用紙に対して、記録ヘッドからインクを略下方に噴射させて記録する下方噴射タイプの記録機構も実用化されている。

【0004】その下方噴射タイプの記録機構におけるインクカートリッジの取付け構造としては、例えば、図5に示すように、上方開放状の箱状のヘッドホルダー131の底壁部131aには、複数の噴射ノズルが形成された記録ヘッド132が取付けられるとともに、その記録ヘッド132に連通するインク通路131cを有する筒状の連結筒部（マニホールド）131bが内側へ突出状に形成され、その連結筒部131bには、インク漏れ防止用のゴム製のシール部材133が取付けられ、更にその先端部には、インクに含まれるゴミなどを除去する細かい編目状のフィルター134が取付けられている。更に、対向する1対の側壁部131d、131fには、矩形開口部131e、131gが夫々形成されている。

【0005】一方、合成樹脂製の箱状のインクカートリッジ135には、記録用のインクを十分吸収させたウレタンフォームなどの多孔質材料からなるインク収容材136が設けられており、その底壁部135aには、筒状の連結筒部131bに外嵌可能な円形のインク供給口135bが形成されている。更に、対向する1対の側壁部135c、135gのうち、一方の側壁部135cには、帯状の弾性片135dが一体形成され、その弾性片135dの高さ方向中段部には、矩形開口部131eに係合可能な断面三角形の爪部135eが形成されるとともに、他方の側壁部135gは矩形開口部131gに係合可能な突起部135pが形成されている。

【0006】そして、インクカートリッジ136をヘッドホルダー131に取付けるには、図5(a)に示すように、先ず突起部135pを矩形開口部131gに係合

させるように、突起部側(図において右側)を低くしてインクカートリッジ135を傾けてヘッドホルダー131内に進入させ、図5(b)に示すように、突起部135pを矩形開口部131gに係合させながら、弾性片側(図において左側)を下降させて、最終的に爪部135eを矩形開口部131eに係合させて取付けるようにしている。一方、弾性片135dの操作部135fを内側に操作して爪部135eと矩形開口部131eとの係合を解除した後、前述した取付けとは逆の順序で、インクカートリッジ135をヘッドホルダー131から取外すようにしている。

【0007】

【発明が解決しようとする課題】図5に基づいて説明したように、下方噴射タイプの記録機構におけるインクカートリッジの取付け構造においては、インクカートリッジ135を傾けた不安定な姿勢でヘッドホルダー131内に進入させながら、突起部135pを矩形開口部131gに係合させると同時に、爪部135eを矩形開口部131eに係合させるので、インクカートリッジ135の取付け操作や取外し操作が複雑化すること、その取付け操作や取外し操作の途中で、インクカートリッジ135の角部を、例えば、突出状の連結筒部材131bに取付けられている高価なフィルター134に引っかけて破損させること、などの問題がある。

【0008】本発明の目的は、インクカートリッジの取付け及び取外し操作を簡単化でき、しかもその取付けや取外し時にヘッドホルダー内の各部に衝突させることなくスムーズに着脱し得るようなインクカートリッジの取付け構造を提供することである。

【0009】

【課題を解決するための手段】請求項1に係るインクカートリッジの取付け構造は、記録用のインクを収容した箱状のインクカートリッジを、上方開放状のヘッドホルダーに設けた対向する1対の側壁部間に上方から着脱可能に取付けるインクカートリッジの取付け構造であって、インクカートリッジの底壁部に形成されたインク供給口と、ヘッドホルダーの底壁部に突設され、インク供給口に連結されてインクカートリッジのインクを記録ヘッドに供給する連結筒部と、ヘッドホルダーの対向する1対の側壁部に形成された1対の係止部と、インクカートリッジに設けられた1対の弾性片であって、対応する係止部に係合可能な係合部を有する1対の弾性片とを備えたものである。

【0010】請求項2に係るインクカートリッジの取付け構造は、請求項1の発明において、前記弾性片は、インクカートリッジに一体形成されたものである。請求項3に係るインクカートリッジの取付け構造は、請求項1又は請求項2の発明において、前記係止部は矩形開口部であり、前記係合部は、弾性片に一体形成した縦断面略三角形の爪部である。

【0011】請求項4に係るインクカートリッジの取付け構造は、請求項3の発明において、前記係合部は弾性片の途中部に形成され、弾性片の上端部には、インクカートリッジをヘッドホルダーに取付けたときに、ヘッドホルダーよりも上側に突出する係合解除用の操作部が設けられたものである。請求項5に係るインクカートリッジの取付け構造は、請求項1の発明において、前記ヘッドホルダーは、1対の対向する側壁部を含む箱状であり、前記1対の側壁部に隣接する他の1対の対向する側壁部に上下方向に延びる案内溝を有し、インクカートリッジは、その案内溝にスライド可能に係合する突起部を有するものである。

【0012】

【作用】請求項1に係るインクカートリッジの取付け構造においては、記録用のインクを収容した箱状のインクカートリッジの底壁部にはインク供給口が形成され、上方開放状のヘッドホルダーの底壁部には、インク供給口に連結されてインクカートリッジのインクを記録ヘッドに供給する連結筒部が突設される一方、ヘッドホルダーの対向する1対の側壁部には、1対の係止部が形成されるとともに、インクカートリッジには、対応する係止部に係合可能な係合部を有する1対の弾性片が設けられているので、インクカートリッジを水平な姿勢に保持して、ヘッドホルダーに設けた対向する1対の側壁間に上方から下降させると、インクカートリッジの1対の弾性片は、その弾性を介してヘッドホルダーの1対の側壁部に当接しながら下降する。そして、ヘッドホルダーの連結筒部がインクカートリッジのインク供給口に連結されたときには、弾性片に設けた爪部が対応する係止部に夫々係合することから、インクカートリッジをヘッドホルダーの各部に衝突させることなくヘッドホルダーに簡単に取付けることができる。

【0013】請求項2に係るインクカートリッジの取付け構造においては、請求項1と同様の作用を奏するが、前記弾性片は、インクカートリッジに一体形成されているので、弾性片を別部品として製作することもなく、また取付ける作業を省くことができ、弾性片付きのインクカートリッジを簡単に製作できる。

【0014】請求項3に係るインクカートリッジの取付け構造においては、請求項1又は請求項2と同様の作用を奏するが、前記係止部は矩形開口部であり、前記係合部は、弾性片に一体形成した縦断面略三角形の爪部であるので、成形時に係止部を側壁部に簡単に形成できるとともに、成形時に爪部を弾性片に一体形成でき、更にその爪部が縦断面略三角形であることから、爪部を対応する矩形開口部に簡単に係合させることができる。

【0015】請求項4に係るインクカートリッジの取付け構造においては、請求項3と同様の作用を奏するが、前記係合部は弾性片の途中部に形成され、弾性片の上端部には、インクカートリッジをヘッドホルダーに取付け

たときに、ヘッドホルダーよりも上側に突出する係合解除用の操作部が設けられているので、インクカートリッジがヘッドホルダーに取付けられているときに、それら操作部を互いに内側に操作して弾性片を弾性変形させることで、弾性片に設けた爪部と矩形開口部との係合を容易に解除でき、しかもインクカートリッジをその取付け姿勢の状態で上方へ引き上げるだけなので、ヘッドホルダーの各部に衝突させることなくヘッドホルダーから片手で簡単に且つスムーズに取外すことができる。

【0016】請求項5に係るインクカートリッジの取付け構造においては、請求項1と同様の作用を奏するが、前記ヘッドホルダーは、前記1対の対向する側壁部を含む箱状であり、前記1対の側壁部に隣接する他の1対の対向する側壁部に上下方向に延びる案内溝を有し、前記インクカートリッジは、その案内溝にスライド可能に係合する突起部を有するので、突起部を対応する案内溝に沿わせることで、インクカートリッジを安定な姿勢に保持しながら、インクカートリッジをヘッドホルダーに対して、ヘッドホルダーの各部に衝突させることなくスムーズに着脱することができる。

【0017】

【実施例】以下、本発明の実施例について、図面に基づいて説明する。本実施例は、インクジェット記録装置に設けた記録機構におけるインクカートリッジの取付け構造に適用した場合のものである。図1に示すように、インクジェット記録装置1は、基本的に、本体ケース2内に、用紙Pを水平方向に搬送する用紙送り機構10と、キャリッジ21を駆動するキャリッジ駆動機構20と、インクカートリッジ35に収容したインクを記録ヘッド32に設けた複数の噴射ノズルから噴射させて用紙Pに記録する記録機構30とを設けたものである。

【0018】先ず、用紙送り機構10について説明すると、図1に示すように、後述するキャリッジ21の用紙搬送方向上流側と下流側とに、1対の送りローラ11、12が夫々左右方向向きに配設され、これら送りローラ11、12の各々は、その左右両端部において、図示しない側壁板で回転可能に支持され、図示外のローラ駆動機構により所定回転方向に駆動されて、給紙された用紙Pが、キャリッジ21の直ぐ下側を経て、キャリッジ21の移動方向と直交状に略水平方向に搬送される。

【0019】次に、キャリッジ駆動機構20について、図1・図2・図4に基づいて説明する。用紙搬送経路の直ぐ上側には、略板状のキャリッジ21が水平に配設され、そのキャリッジ21は、送りローラ11、12と並行に配設されたガイドロッド22によりその後端部において左右方向移動自在に支持されるとともに、そのガイドロッド22と並行に配設されたガイドレール23によりその前端部において左右方向移動自在に支持されている。これらガイドロッド22とガイドレール23とは、その左右両端部において、側壁板4、5で夫々支持され

ている。

【0020】一方、キャリッジ21の移動範囲の左端部には、従動プーリー24が図示外のフレームに回転可能に枢支されるとに、その右端部には、キャリッジ駆動モータ26の駆動軸に取り付けた駆動プーリー25が設けられ、無端状のタイミングベルト27がこれら両プーリー24、25に互って掛け渡され、キャリッジ21の下端部においてこのタイミングベルト27に連結されている。そして、キャリッジ駆動モータ26が回転駆動されると、これら両プーリー24、25とタイミングベルト27とを介して、キャリッジ21が、これらガイドロッド22及びガイドレール23に支持されて、記録方向（右方向）及び反記録方向（左方向）に移動駆動される。

【0021】次に、キャリッジ21に載置され、インクの噴射により用紙Pに記録する記録機構30について、図1～図4に基づいて説明する。前記キャリッジ21上には、上方開放状の箱状のヘッドホルダー31が固着されている。そのヘッドホルダー31の底壁部31aの下側の後端部側には、複数の噴射ノズルに対応する複数本のインク供給路32aが形成された記録ヘッド32が取付けられるとともに、その底壁部31aの中央部には、上方に突出した筒状の連結筒部（所謂マニホールド）31bが形成されている。即ち、記録ヘッド32からインクを略下方に噴射させて、直ぐ下側に水平方向に搬送される用紙Pに記録する下方噴射タイプに構成されている。

【0022】その連結筒部31bの内部には、記録ヘッド32に連通するインク通路31cが形成されるとともに、その連結筒部31bの外側は、インク漏れを防止する為にゴム製のシール部材33が装着されている。その連結筒部31bの上端には、供給されるインクに含まれる塵などを除去する為に、直径数ミクロンのステンレス線材を網状に編んだフィルター34が取付けられている。前記ヘッドホルダー31の前後に設けられた対向する1対の側壁部31e、31fの上端近傍部には、係止部である左右方向に長い矩形開口部31e、31gが夫々形成されている。更に、ヘッドホルダー31の左右に設けられた対向する1対の側壁部31h、31jの内側には、上下方向に延びる所定幅を有する案内溝31i、31kが夫々形成されている。

【0023】前記インクカートリッジ35は、ヘッドホルダー31に着脱可能な合成樹脂製の箱状であり、その内部には、記録用のインクを十分に浸み込ませたウレタンフォームなどからなるインク収容材36が設けられている。また、インクカートリッジ35の底壁部35aの中央部には、連結筒部32bに外嵌可能な円形のインク供給口35bが形成されている。そのインクカートリッジ35の前後に設けられた対向する1対の側壁部35c、35gの下端近傍部には、弾性を有し上方に延びる

所定幅の弾性片35d、35hの下端部が一体的に夫々形成されている。

【0024】そして、各弾性片35d、35hの高さ方向中段部には、係合部である縦断面略三角形の爪部35e、35iが夫々形成されるとともに、各弾性片35d、35hの上端部には、インクカートリッジ35をヘッドホルダー31に取付けたときに、ヘッドホルダー31よりも上側に突出する係合解除用の操作部35f、35jが夫々形成されている。更に、インクカートリッジ35の左右に設けられた対向する1対の側壁部35k、35mの外側には、ヘッドホルダー31の側壁部31h、31jに形成された対応する案内溝31i、31kにスライド可能に係合する上下方向に延びた突起部35l、35nが夫々形成されている。

【0025】次に、インクカートリッジ35をヘッドホルダー31に取付けるときの作用について、図3・図4に基づいて説明する。先ず、図4に示すように、弾性片35d、35hが矩形開口部31e、31gに対応する向きで、しかもインクカートリッジ35を水平な姿勢に保持して、ヘッドホルダー31内に上方から下降させる。このとき、これら突起部35l、35nに対応する案内溝31i、31kに係合させてスライドすることで、インクカートリッジ35を、前後方向と左右方向とに位置決めでき且つ安定な水平姿勢に保持しながら、インクカートリッジ35をヘッドホルダー31内に進入させることができる。

【0026】このとき、インクカートリッジ35の1対の弾性片35d、35hは、その弾性を介してヘッドホルダー31の1対の側壁部31d、31fに夫々当接しながら下降する。そして、図3に示すように、ヘッドホルダー31の連結筒部32bがインクカートリッジ35のインク供給口35bに連結されたときには、弾性片35d、35hに設けた爪部35e、35iが対応する矩形開口部31e、31gに夫々自動的に確実に係合して、インクカートリッジ35をヘッドホルダー31内に取付けることができる。

【0027】このとき、連結筒部32bの上端部がインク供給口35bを挿通してインク収容材36に下方から押圧状に接触する。これにより、インク収容材36のインクが連結筒部32bのインク供給路32aを介して記録ヘッド32に供給されるようになっている。ここで、シール部材33がインク供給口35bに密着状に押圧されることにより、インク収容材36のインクが外部に漏れるのを防止されている。

【0028】一方、図3に示すように、インクカートリッジ35がヘッドホルダー31に取付けられているときに、弾性片35d、35hに設けられた操作部35f、35jを互いに内側に操作して、各弾性片35d、35hを2点鎖線で示すように弾性変形させることで、弾性片35d、35hに設けた爪部35e、35iと矩形開口部31e、31gとの係合を容易に解除でき、しかもインクカートリッジ35をその取付け姿勢の状態です

上方へ取外することができる。

【0029】このように、箱状のインクカートリッジ35の底壁部35aにインク供給口35bを設け、ヘッドホルダー31の底壁部31aに連結筒部32bを設けるとともに、ヘッドホルダー31の1対の側壁部31d、31fに1対の矩形開口部31e、31gを設け、更にインクカートリッジ35の1対の側壁部35c、35gに、矩形開口部31e、31gに係合可能な爪部35e、35iを有する1対の弾性片35d、35hを設けたので、インクカートリッジ35を水平な姿勢に保持して、ヘッドホルダー31内に上方から下降させるだけで、インクカートリッジ35の1対の弾性片35d、35hが弾性変形して側壁部31d、31fに当接しながら下降して、弾性片35d、35hの爪部35e、35iが対応する矩形開口部31e、31gに夫々自動的に係合することから、インクカートリッジ35をヘッドホルダー31のフィルター34などの各部に衝突させることなく、ヘッドホルダー31に簡単に取付けることができる。

【0030】更に、インクカートリッジ35がヘッドホルダー31に取付けられているときに、弾性片35d、35hの操作部35f、35jを互いに内側に操作して、各弾性片35d、35hを弾性変形させることで、爪部35e、35iと矩形開口部31e、31gとの係合を容易に解除でき、しかもインクカートリッジ35をその取付け姿勢の状態です上方へ引き上げるだけで、ヘッドホルダー31の各部に衝突させることなく、簡単に且つスムーズに取外することができる。

【0031】尚、前記ヘッドホルダー31は、対向する1対の側壁部31d、31fだけを有するものであってもよく、またヘッドホルダー31が傾斜状にキャリッジ21上に取付けられ、そのヘッドホルダー31に対して斜め方向に取付ける取付け構造であってもよい。更に、インクカートリッジ35の弾性片35d、35hを、底壁部35aからU字状に上方に延びるように形成してもよく、また1対だけでなく複数対形成してもよい。尚、前記実施例に関し、既存の技術や当業者に自明の技術に基いて種々の変更を加えることもあり得る。

【0032】

【発明の効果】請求項1に係るインクカートリッジの取付け構造によれば、箱状のインクカートリッジの底壁部にインク供給口を設け、ヘッドホルダーの底壁部に連結筒部を設けるとともに、ヘッドホルダーの1対の側壁部に1対の係止部を設け、更にインクカートリッジに、係止部に係合可能な係合部を有する1対の弾性片を設けたので、インクカートリッジを水平な姿勢に保持して、ヘッドホルダーに設けた対向する1対の側壁間に上方から下降させるだけで、インクカートリッジの1対の弾性片

が弾性変形してヘッドホルダーの側壁部に当接しながら下降して、弾性片に設けた爪部が対応する係止部に夫々係合することから、インクカートリッジをヘッドホルダーの各部に衝突させることなくヘッドホルダーに簡単に取付けることができる。

【0033】請求項2に係るインクカートリッジの取付け構造によれば、請求項1と同様の効果を奏するが、前記弾性片は、インクカートリッジに一体形成されているので、弾性片を別部品として製作することもなく、また取付ける作業を省くことができ、弾性片付きのインクカートリッジを簡単に製作できる。

【0034】請求項3に係るインクカートリッジの取付け構造によれば、請求項1又は請求項2と同様の効果を奏するが、前記係止部は矩形開口部であり、前記係合部は、弾性片に一体形成された縦断面略三角形の爪部であるので、成形時に係止部を側壁部に簡単に形成できるとともに、成形時に爪部を弾性片に一体形成でき、更にその爪部が縦断面略三角形であることから、爪部を対応する矩形開口部に簡単に係合させることができる。

【0035】請求項4に係るインクカートリッジの取付け構造によれば、請求項3と同様の効果を奏するが、前記係合部は弾性片の途中部に形成され、弾性片の上端部には、インクカートリッジをヘッドホルダーに取付けたときに、ヘッドホルダーよりも上側に突出する係合解除用の操作部が設けられているので、インクカートリッジがヘッドホルダーに取付けられているときに、それら操作部を互いに内側に操作して弾性片を弾性変形させることで、弾性片に設けた爪部と矩形開口部との係合を容易に解除でき、しかもインクカートリッジをその取付け姿勢の状態で上方へ引き上げるだけなので、ヘッドホルダーの各部に衝突させることなくヘッドホルダーから片手で簡単に且つスムーズに取外すことができる。

【0036】請求項5に係るインクカートリッジの取付け構造によれば、請求項1と同様の効果を奏するが、前記ヘッドホルダーは、前記1対の対向する側壁部を含む箱状であり、その1対の側壁部に隣接する他の1対の対向する側壁部に上下方向に延びる案内溝を有し、前記インクカートリッジは、その案内溝にスライド可能に係合する突起部を有するので、突起部を対応する案内溝に沿わせることで、インクカートリッジを安定な姿勢に保持しながら、インクカートリッジをヘッドホルダーに対して、ヘッドホルダーの各部に衝突させることなくスムー

ズに着脱することができる。

【図面の簡単な説明】

【図1】本発明の実施例に係る、インクジェット記録装置の概略斜視図である。

【図2】インクジェット記録装置の部分平面図である。

【図3】図2のA-A線縦断側面図である。

【図4】ヘッドホルダとインクカートリッジの分解斜視図である。

【図5】従来技術に係り、(a)はインクカートリッジをヘッドホルダーに取付ける状態を示す要部縦断側面図であり、(b)はインクカートリッジをヘッドホルダーに取付けた状態の(a)相当図である。

【符号の説明】

1 インクジェット記録装置

30 記録機構

31 ヘッドホルダー

31a 底壁部

31b 連結筒部

31d 側壁部

31e 矩形開口部

31f 側壁部

31g 矩形開口部

31h 側壁部

31i 案内溝

31j 側壁部

31k 案内溝

35 インクカートリッジ

35a 底壁部

35b インク供給口

35c 側壁部

35d 弾性片

35e 爪部

35f 操作部

35g 側壁部

35h 弾性片

35i 爪部

35j 操作部

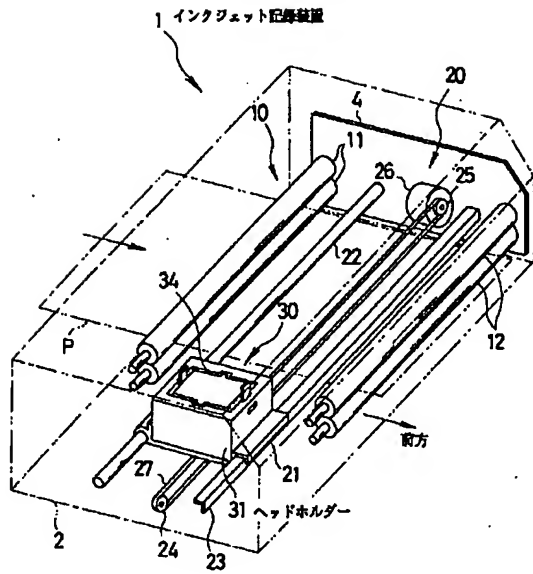
35k 側壁部

35l 突起部

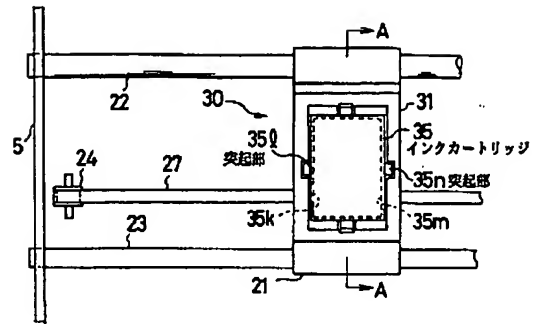
35m 側壁部

35n 突起部

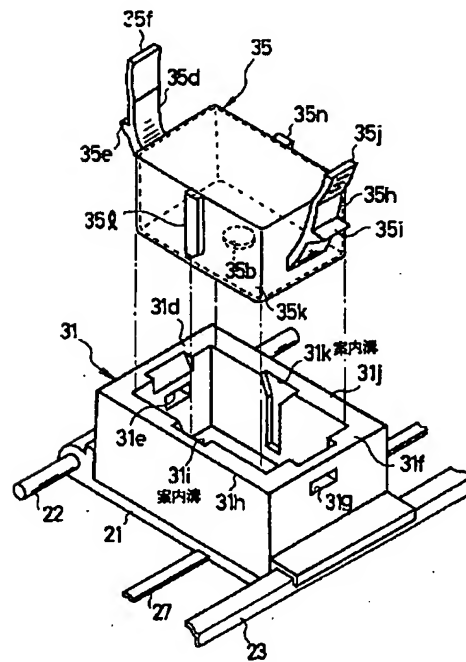
【図1】



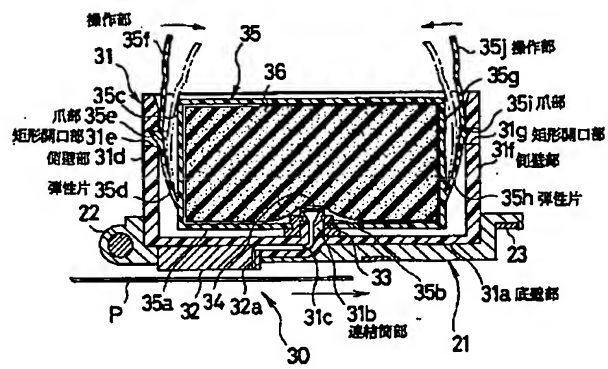
【図2】



【図4】

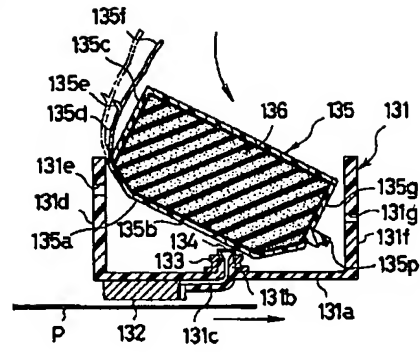


【図3】

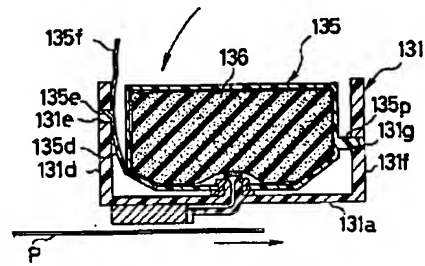


【図5】

(a)



(b)



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